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References to the papers read before the Institute are indicated by the word *Paper* following the page number. The letter *P.* denotes a reference in Section 1 of the Journal which contains the reports of the proceedings of meetings, the papers read, and the discussions thereon. The letter *A.* denotes a reference to the section dealing with abstracts.

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American Inst. of Mining and Metallurgical Eng., "Transactions, Iron and Steel Division 1937," 227*A*.
Atkins, E. A., "Practical Sheet and Plate Metal Work," 227*A*.
Auwers, O. von, "Magnetische und elektrische Eigenschaften des Eisens und seiner Legierungen," 294*A*.
"Bericht über den Leobener Bergmannstag," 164*A*.
Bitter, F., "Introduction to Ferromagnetism," 164*A*.
British Chemical Plant Manufacturers' Assoc. "Official Directory," 364*A*.
Buell, W. C., jun., "The Open-Hearth Furnace," Vol. II, 44*A*.
Comber, A. W., "Magnesite as a Refractory," 228*A*.
Desch, C. H., "Metallography," 4th ed., 98*A*.
Dutch Corrosion Committee, "Third Report," 167*A*.
Hartley, L. A., "Elementary Foundry Technology," 364*A*.
International Assoc. for Testing Materials, "London Congress 1937," 165*A*.
Iron and Steel Institute, "Carnegie Scholarship Memoirs," 228*A*.
Jones, W. D., "Powder Metallurgy," 99*A*.
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Leier, F. W., "Hartmetalle in der Werkstatt," 44*A*.
Malette, J., "La Métallographie en Couleurs," 165*A*.

BOOK NOTICES (*contd.*)—
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Society of Chemical Industry, "Reports of the Progress of Applied Chemistry," 367*A*.
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Stockdale, D., and J. Dexter, "Clowes and Coleman's Quantitative Chemical Analysis," 368*A*.
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Verein deutscher Eisenhüttenleute, "Gemeinfassliche Darstellung des Eisenhüttenwesens," 14 Auflage, 47*A*.
Verein deutscher Eisenhüttenleute, "Werkstoff-Handbuch, Stahl und Eisen," 296*A*.
Vogel, R., "Die heterogen Gleichgewichte," 48*A*.
Warnock, F. V., "Strength of Materials," 3rd ed., 99*A*.
"Zeitschrift für angewandte Mineralogie," 297*A*.
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